

HIV/AIDS in the Developing World



U.S. Agency for International Development
Bureau for Global Programs, Field Support, and Research
Office of Health and Nutrition

U.S. Department of Commerce
Economics and Statistics Administration
BUREAU OF THE CENSUS

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HIV/AIDS in the Developing World

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Highlights

- As of the end of 1997, the United Nations Joint Programme on HIV/AIDS estimated that over 40 million people had become infected with HIV since the beginning of the pandemic in the late 1970s and that over 11 million of these people had already died.
- AIDS has cut life expectancy by 4 years in Nigeria, 18 years in Kenya and 26 years in Zimbabwe—only a few of the countries where mortality from the disease is having a major demographic impact. AIDS results in higher mortality rates in childhood, as well as among young adults where mortality otherwise is low. As a result, AIDS deaths will have a larger impact on life expectancies than on some other demographic indicators in these nations.
- Infant and child mortality rates in the most severely affected countries are higher due to AIDS, reversing the declines that had been occurring in many countries during the 1970s and 1980s. Over 30 percent of all children born to HIV-infected mothers in Sub-Saharan Africa will themselves become HIV infected.
- In spite of the massive impact on the numbers of deaths in the most severely affected countries, population growth rates will remain positive in the year 2010 although some will be near zero.
- In 21 African countries more than 5 percent of the urban population is HIV positive. HIV/AIDS epidemics continue to spread in Sub-Saharan Africa, particularly in Botswana and South Africa. Other severely affected countries include Namibia, Swaziland, Zambia and Zimbabwe, where 19 to 25 percent of all adults are HIV-positive.
- The HIV pandemic in Asia is extremely diverse ranging from no evidence of HIV epidemics in some countries such as Mongolia and South Korea to countries such as Thailand and Burma with 2 percent of adult populations now HIV positive.
- In Latin America and the Caribbean, Guyana, Haiti, Honduras and Brazil are also seeing the impacts of AIDS mortality.

Introduction

Two demographic events have occurred in the second half of the twentieth century that have softened the surge in human numbers. The first is the progressive decline in fertility levels that has occurred, particularly in the world's developing regions, since the early 1960s. The second event is the emergence of the global HIV/AIDS pandemic, which has raised mortality and slowed growth in every world region, but with the greatest impacts in a number of Sub-Saharan African, Asian and Latin American nations.

HIV/AIDS has had, and continues to have, substantial and sometimes dramatic impacts on mortality levels in countries most seriously affected. However, AIDS will not overcome the momentum of population growth at the regional level, even in Sub-Saharan Africa. This will be true particularly if changes in behavior, already observed in some settings, bring

about an early curtailment of HIV infections in affected countries.

Current estimates indicate over 40 million people have become infected with HIV since the beginning of the pandemic in the late 1970s, and over 11 million of these people have already died. While the majority of the infections have occurred in Sub-Saharan Africa up to now, the spread of the disease in Asia during the coming years may result in many more infections in that region than in Sub-Saharan Africa.

This report provides an update on one of the key international health and demographic events of our time, and a source of some of the uncertainty associated with demographic change in the coming decades—the worldwide HIV/AIDS pandemic. Originally proposed as the focus chapter of the Census Bureau's *World Population Profile: 1998*, this report includes information on the impact

of AIDS on mortality and population. In addition, the report reviews the current status of the HIV/AIDS epidemics in Africa, Asia, and Latin America.

This report presents the methodology and results of incorporating AIDS mortality into the U.S. Census Bureau's population estimates and projections for severely affected countries of the world. The available information and the methodology and assumptions used for incorporating AIDS mortality into the population estimates and projections are described in Appendix A.

Questions about the demographic impacts of the HIV/AIDS pandemic, presented in this report, or about the methodology employed in estimating those impacts may be directed to: Chief, Health Studies Branch, International Programs Center, Census Bureau, Washington, DC 20233-8860.

This report is available on the Census Bureau web site as the focus chapter in *World Population Profile: 1998*. The web address is: <http://www.census.gov/IPC/www/wp98.html>. The data presented in this report draw upon information stored in two databases maintained and annually updated by the International Programs Center of the U.S. Bureau of the Census (IPC). IPC compiles, evaluates, electronically stores and analyzes selected demographic and health data for all countries. IPC's Health Studies branch maintains the **HIV/AIDS Surveillance Data Base**, a compilation of information on HIV prevalence from all available studies from Africa, Asia, and Latin America. The **International Data Base (IDB)** contains statistical tables providing demographic and socioeconomic data for all countries of the world.

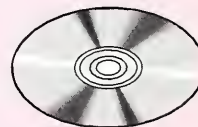
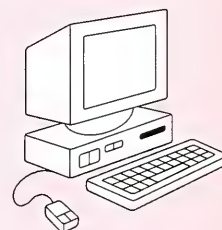
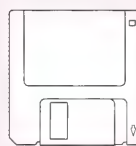
- The **HIV/AIDS Surveillance Data Base** includes all available epidemiological information on HIV/AIDS seroprevalence and incidence for countries in Africa, Asia, Latin America and from select New Independent States taken from the scientific literature and from unpublished reports prepared for international conferences and various workshops. The current update of the data base contains nearly 40,000 individual data records drawn from over 4,000 publications and presentations.

The HIV/AIDS Surveillance Data Base can be obtained free of charge on CD-ROM or diskette from the Health Studies Branch, or downloaded from the Internet at:

<http://www.census.gov/ipc/www/hivaidsn.html>

Requests for specific data items, CD-ROM or diskettes, or questions about the HIV/AIDS Surveillance Data Base should be directed to:

Chief, Health Studies Branch
International Programs Center
Bureau of the Census
Washington, DC 20233-8860 USA
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Internet e-mail: ipc-hiv@census.gov



- The **International Data Base** contains information derived from censuses and surveys (for example, population by age and sex, labor force, and contraceptive use) and administrative records (for example, registered births and deaths) for selected years from 1950 to the present. Some variables are available by urban/rural residence. The IDB contains the International Programs Center's current estimates and projections of fertility, mortality, migration and population on a single-year basis to the year 2020, and for every fifth year from 2025 through 2050. IDB estimates and projections may be more recent than those presented in this report, which are current to September 1997.

Direct access and further information about the IDB are available through the Internet at:

<http://www.census.gov/ipc/www/idbnew.html>

Requests for specific data items from, or questions about, the IDB should be directed to:

Chief, Information and Research Branch
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Washington, DC 20233-8860 USA



HIV/AIDS in the Developing World



HIV/AIDS in the Developing World

Well into the second decade of the HIV/AIDS pandemic, AIDS mortality is having major demographic impacts on populations in countries where the epidemic is most severe.

- Crude death rates are higher
- Improvements in infant and child mortality rates have been reversed
- Population growth has slowed
- Life expectancies have fallen

The HIV/AIDS epidemics continue to develop in Sub-Saharan Africa. Many can be described as generalized with high (over 5 percent) HIV prevalence in general adult population and increasing urban to rural equalization of HIV prevalence. Although HIV seroprevalence levels have stabilized or declined in some urban areas (Uganda), in others the epidemics are increasing rapidly (Botswana, South Africa). Some countries initially spared are now seeing increases in HIV seroprevalence (Nigeria, Cameroon). The most dramatic impacts will be in countries which had seen the most improvements in these indicators over the past two decades (Botswana and Zimbabwe).

The HIV epidemics in Asia are extremely diverse, ranging from countries with no evidence of an epidemic (Mongolia, South Korea) to countries

with high HIV prevalence among populations exhibiting high-risk behaviors as well as evidence of HIV prevalence in the general population (Cambodia, Burma, and Thailand). The HIV epidemic in India varies from state to state, with high HIV prevalence levels in west and southern India, but low HIV seroprevalence levels in east and northern India. However, more data on HIV prevalence and trends, particularly from India and China, will be required to determine the scope of the epidemic and its demographic consequences in this region.

HIV/AIDS is well established in the Caribbean and Latin American region but information is scarce. Current levels of HIV prevalence and subsequent AIDS mortality are having impacts on populations in Guyana, Haiti, Honduras, and Brazil. The level of HIV prevalence in Guyana is similar to that seen in some Sub-Saharan African countries. HIV prevalence in Haiti has remained stable for several years—a pattern similar to the trends seen in the Democratic Republic of Congo (Congo (Kinshasa), formerly Zaire). HIV epidemics in other countries can be described as either nascent: few cases of AIDS and low HIV prevalence in high-risk groups in urban centers or as concentrated: high HIV prevalence in high-risk groups and low prevalence in general adult populations.

By the end of 1997, the United Nations Joint Programme on HIV/AIDS (UNAIDS) estimated that over 40 million people had become infected with HIV since the beginning of the pandemic in the late 1970s and that over 11 million of these people had already died.¹ The majority of the infections have occurred in Sub-Saharan Africa, but the increases that are occurring in Asia may result in more infections in that region than in Sub-Saharan Africa.

¹UNAIDS/WHO (1998:6).

AIDS Mortality Will Have Major Demographic Impacts

The particular pattern of mortality due to AIDS is the reason for these major impacts.^{2,3} All mortality indicators will be affected. Crude death rates and infant and child mortality rates will be higher than would have been expected without HIV/AIDS. The most dramatic difference will occur in life expectancies, due to the increases in mortality in the young adult ages. For the 1998 round of population estimates and projections prepared by the Census Bureau, AIDS mortality was incorporated into those countries most severely affected by the AIDS pandemic: 21 African countries, 3 Asian countries and 4 countries in Latin America and the Caribbean. This report describes the impact of the HIV/AIDS pandemic on populations and the current status of the HIV/AIDS epidemics in selected countries in these regions of the world.⁴

Crude Death Rates Are Higher

The most direct impact of AIDS is to increase the number of deaths in populations affected. Crude death rates, the number of people dying per 1,000 population, have already been affected by AIDS. By the year 2010, crude death rates will be considerably higher in those countries severely affected by HIV/AIDS epidemics than would have been expected without AIDS (Tables 1 and 2).

²Bureau of the Census (1994).

³Stanecki and Way (1991).

⁴See Appendix A for discussion of population projections incorporating AIDS.

Table 1.

Demographic Indicators With and Without AIDS: 1998

Country	Growth rate		Life expectancy		Crude death rate		Infant mortality rate		Child mortality (under age 5)	
	With AIDS	Without AIDS	With AIDS	Without AIDS	With AIDS	Without AIDS	With AIDS	Without AIDS	With AIDS	Without AIDS
Botswana	1.1	2.4	40.1	61.5	20.9	8.6	59.3	36.4	121.1	57.4
Burkina Faso	2.7	3.2	46.1	55.4	17.7	13.1	109.2	101.1	179.1	156.5
Burundi	3.5	4.0	45.6	55.4	17.4	12.2	101.2	92.1	157.1	131.0
Cameroon	2.8	3.2	51.4	58.6	14.0	10.6	76.9	70.7	128.1	109.6
Central African Republic	2.0	2.5	46.8	56.3	16.8	12.0	105.7	97.7	162.6	140.2
Congo (Brazzaville)	2.2	2.7	47.1	57.2	16.5	11.3	102.7	94.0	166.3	142.5
Congo (Kinshasa)	3.0	3.3	49.3	54.4	15.2	12.7	101.6	97.1	152.7	139.3
Côte d'Ivoire	2.4	3.0	46.2	56.5	16.1	10.7	95.9	86.7	149.2	122.7
Ethiopia	2.2	2.9	40.9	50.9	21.3	15.0	125.7	115.4	197.6	169.2
Kenya	1.7	2.5	47.6	65.6	14.2	6.2	59.4	44.7	107.0	64.9
Lesotho	1.9	2.3	54.0	62.0	12.8	9.2	78.3	71.2	120.2	98.3
Malawi	1.7	2.7	36.6	51.1	23.7	14.4	133.8	117.9	231.6	190.3
Namibia	1.6	2.9	41.5	65.3	19.8	7.5	66.8	44.0	125.5	62.1
Nigeria	3.0	3.2	53.6	57.8	13.0	10.9	70.7	65.9	139.0	124.4
Rwanda	2.5	3.2	41.9	53.9	19.0	12.2	113.3	101.3	181.9	148.5
South Africa	1.4	1.9	55.7	65.4	12.3	7.8	52.0	43.3	95.5	69.7
Swaziland	2.0	3.2	38.5	58.1	21.4	10.1	103.4	83.8	168.1	114.4
Tanzania	2.1	2.6	46.4	55.2	16.7	12.1	96.9	89.2	160.1	137.8
Uganda	2.8	3.5	42.6	54.1	19.0	12.5	92.9	81.3	164.5	132.9
Zambia	2.1	3.3	37.1	56.2	22.6	11.4	92.6	72.0	181.2	125.7
Zimbabwe	1.1	2.5	39.2	64.9	20.1	6.2	61.8	35.9	123.4	50.5
Brazil	1.2	1.5	64.4	71.4	8.5	5.6	37.0	33.5	47.3	37.5
Guyana	-0.5	-0.3	62.3	65.7	8.7	7.3	48.7	45.4	71.4	61.3
Haiti	1.5	2.0	51.4	55.5	14.2	12.6	99.0	95.6	155.7	145.9
Honduras	2.3	2.5	65.0	69.2	7.0	5.5	41.9	38.6	61.2	50.4
Burma	1.6	1.8	54.5	57.1	12.5	11.2	78.4	76.3	113.1	106.4
Cambodia	2.5	2.7	48.0	50.7	16.5	15.0	106.8	104.2	179.7	171.9
Thailand	1.0	1.1	69.0	71.3	7.1	6.1	30.8	29.7	40.8	36.2

Note: Life expectancy (e_0), infant mortality, and child mortality (${}_5q_0$) are for both sexes combined.

Growth rate is given as a percent. Crude death rate is deaths per 1,000 population.

Source: U.S. Bureau of the Census, International Data Base and unpublished tables.

Table 2.

Demographic Indicators With and Without AIDS: 2010

Country	Growth rate		Life expectancy		Crude death rate		Infant mortality rate		Child mortality (under age 5)	
	With AIDS	Without AIDS	With AIDS	Without AIDS	With AIDS	Without AIDS	With AIDS	Without AIDS	With AIDS	Without AIDS
Botswana	0.2	1.9	37.8	66.3	23.8	6.4	55.2	26.3	119.5	38.3
Burkina Faso	2.4	3.1	45.6	60.7	16.3	9.0	86.6	73.7	144.7	108.7
Burundi	2.3	3.0	45.3	60.8	16.4	8.6	79.6	66.3	128.6	90.9
Cameroon	2.5	3.0	49.8	63.2	14.1	8.2	63.8	52.9	108.3	78.0
Central African Republic	1.9	2.3	50.9	61.9	14.1	9.1	79.8	71.6	122.7	99.1
Congo (Brazzaville)	1.7	2.3	49.0	62.4	14.8	8.2	77.5	67.3	125.9	97.1
Congo (Kinshasa)	2.9	3.3	51.9	59.8	12.6	9.1	77.0	70.4	116.2	97.3
Côte d'Ivoire	2.2	2.9	46.7	61.8	15.4	8.0	74.8	61.8	120.9	84.2
Ethiopia	1.9	2.9	38.6	54.7	21.8	12.1	112.4	95.4	183.4	136.7
Kenya	0.6	1.8	43.7	69.2	18.6	5.2	53.9	32.9	105.2	45.4
Lesotho	0.8	1.9	44.7	65.9	18.7	7.4	71.1	52.8	121.9	70.7
Malawi	0.7	2.2	34.8	56.8	25.3	10.4	113.1	88.4	202.6	136.0
Namibia	1.2	2.8	38.9	70.1	21.9	5.2	57.2	28.3	118.8	37.5
Nigeria	2.1	3.0	46.3	64.9	16.1	7.1	57.4	41.4	112.7	68.2
Rwanda	1.4	2.9	37.6	59.2	23.1	9.4	97.1	74.7	166.4	105.5
South Africa	0.4	1.4	48.0	68.2	17.8	7.1	50.7	32.3	99.5	48.5
Swaziland	1.7	3.1	37.1	63.2	22.6	7.5	85.3	58.6	152.2	77.5
Tanzania	1.8	2.6	46.1	60.7	16.3	8.9	77.8	65.2	131.3	95.8
Uganda	3.1	3.5	47.6	59.5	14.4	8.8	68.6	58.5	120.6	92.2
Zambia	2.0	3.1	37.8	60.1	21.5	9.0	81.7	58.4	160.7	96.9
Zimbabwe	0.3	1.9	38.8	69.5	22.5	4.9	53.7	24.0	115.6	31.8
Brazil	0.8	1.1	67.7	75.5	8.5	5.4	22.3	18.4	31.4	20.6
Guyana	0.0	1.0	51.1	67.9	16.9	7.5	50.1	36.9	86.6	48.7
Haiti	1.7	2.1	54.4	58.8	12.5	10.2	83.4	80.1	129.1	119.0
Honduras	1.3	1.9	59.7	73.4	9.7	4.4	32.1	23.5	55.2	29.3
Burma	1.4	1.6	58.8	62.8	10.7	8.8	55.7	52.4	80.3	70.1
Cambodia	2.4	2.6	52.8	56.7	12.8	10.9	81.7	78.1	133.9	123.9
Thailand	0.6	0.7	72.9	75.1	7.4	6.5	18.7	17.8	25.0	21.2

Note: Life expectancy (e_0), infant mortality, and child mortality (${}_5q_0$) are for both sexes combined.

Growth rate is given as a percent. Crude death rate is deaths per 1,000 population.

Source: U.S. Bureau of the Census, International Data Base and unpublished tables.

In Sub-Saharan Africa, crude death rates are dramatically higher over what would have been expected without AIDS due to the additional AIDS mortality. For example, in Cameroon and Nigeria, where HIV prevalence was approaching 5 percent of the total adult population in 1995, crude death rates in 1998 are 20 to 30 percent higher. By the year 2010, the crude death rate will be nearly twice as high in Cameroon and over twice as high in Nigeria. In Zimbabwe the crude death rate in 1998 is over three times as high as it would have been without AIDS and will be more than four times as high by the year 2010 (Figure 1).

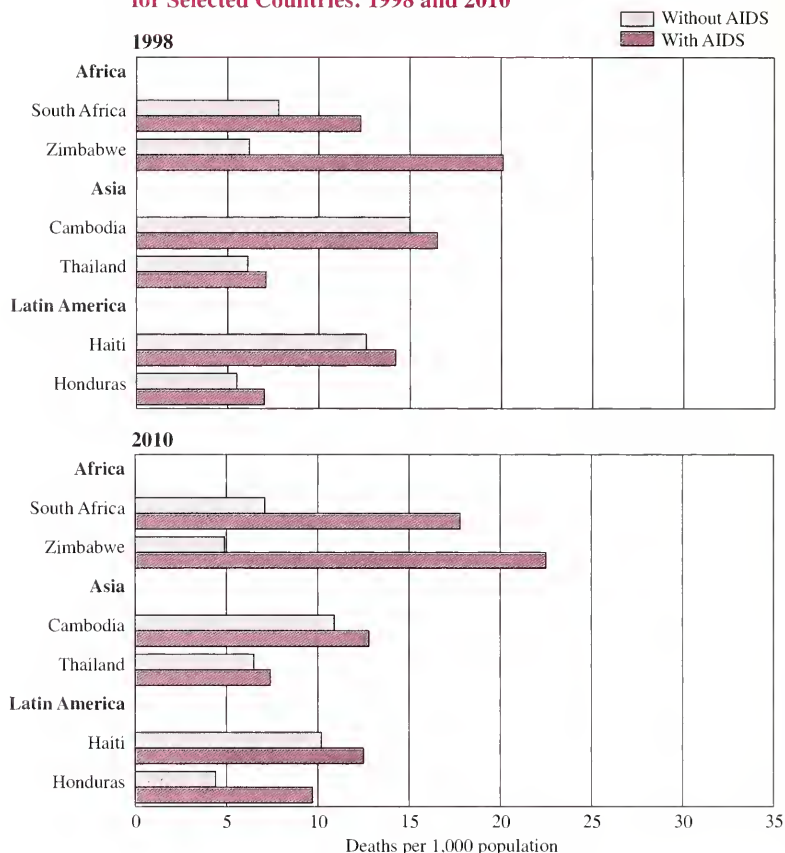
Because of AIDS mortality, crude death rates are at least 10 percent higher in 1998 in Burma, Cambodia and Thailand. By 2010, the crude death rate will be 20 percent higher than it would have been without AIDS in Burma and approximately 15 percent higher in Cambodia and Thailand.

In Latin America, AIDS mortality will have varying impacts on crude death rates. In Brazil, AIDS mortality has resulted in a crude death rate that is 50 percent higher. By the year 2010, the crude death rate will continue to be about 50 percent higher. In Haiti, AIDS mortality will result in a crude death rate that is about 13 percent higher in 1998 and by the year 2010, the crude death rate will be about 20 percent higher than it would have been without AIDS. In Guyana and Honduras, however, by the year 2010, crude death rates will be more than twice as high as they would have been without AIDS.

AIDS is Affecting Infant Mortality Rates

Infant mortality rates are higher due to AIDS, reversing the declines that had been occurring in many countries during the 1970s and 1980s. Over 30 percent of all children born to HIV-infected mothers in Sub-Saharan Africa will themselves become HIV infected. The

Figure 1.
**Crude Death Rate With and Without AIDS
for Selected Countries: 1998 and 2010**



Source: U.S. Bureau of the Census, International Data Base and unpublished tables.

relative impact of AIDS on infant mortality will depend on both the level of HIV in the population and the infant mortality rates from other causes.

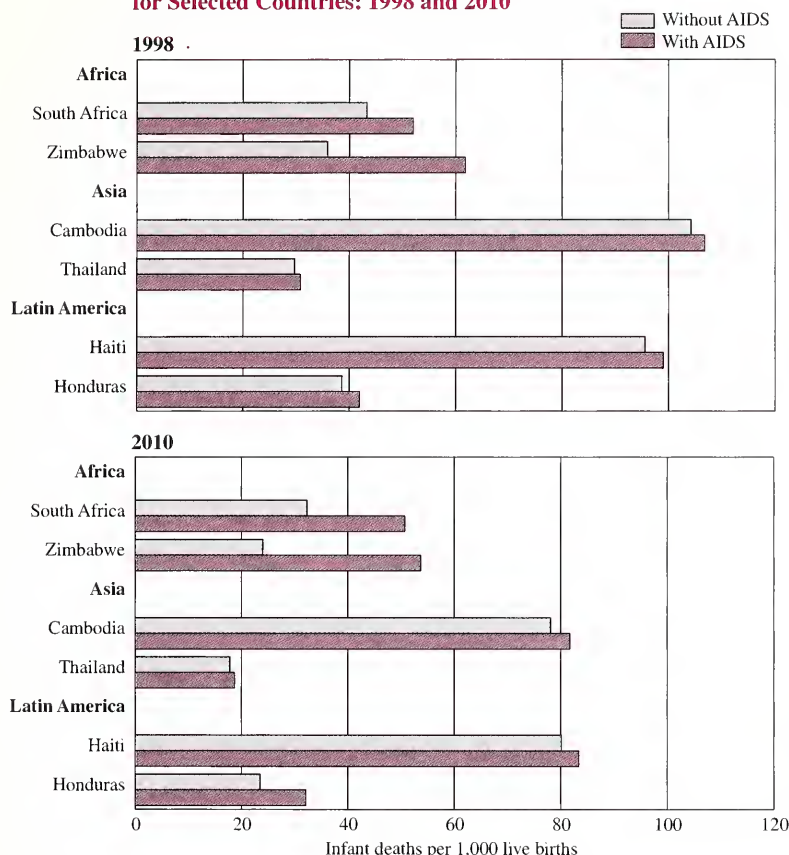
Those countries that had significantly reduced non-AIDS infant mortality and have high HIV prevalence rates will see a greater relative impact.

In West Africa, AIDS mortality has already resulted in higher infant mortality rates. In Cameroon and Côte d'Ivoire, infant mortality rates are already 10 percent higher and are projected to be 20 percent higher over what they would have been without AIDS in 2010. In Nigeria, the infant mortality rate is estimated to be 7 percent higher in 1998 and is projected to

be nearly 40 percent higher over what would have been expected by the year 2010 without AIDS.

In East and Southern Africa, the regions most affected by the AIDS epidemic, infant mortality rates are nearly 70 percent higher over what they might have been without AIDS. In Kenya, the infant mortality rate is estimated to be 33 percent higher. By the year 2010, it will be over 60 percent higher. In South Africa, the infant mortality rate is estimated to be 20 percent higher. And in Zimbabwe, perhaps the most severely affected country in Sub-Saharan Africa, the infant mortality rate is now estimated to be 72 percent higher than it

Figure 2.
**Infant Mortality Rate With and Without AIDS
 for Selected Countries: 1998 and 2010**



Source: U.S. Bureau of the Census, International Data Base and unpublished tables.

would have been without AIDS (Figure 2). By the year 2010, the infant mortality rate in Zimbabwe will be more than twice as high as it would have been without AIDS.

Since the HIV epidemics in Asia occurred later than in Africa, and prevalence rates have not yet reached the same levels as have been seen in Africa, the impacts on infant mortality rates are not yet as severe. In Burma, Cambodia and Thailand, infant mortality rates are estimated to be 3 percent higher than they would have been

without AIDS. By the year 2010, they will be 5 to 6 percent higher.

In Latin America, the infant mortality rate is 10 percent higher in Brazil, 9 percent higher in Honduras, 7 percent higher in Guyana, and 4 percent higher in Haiti. By the year 2010, the infant mortality rate will be over 21 percent higher in Brazil than it would have been without AIDS, over 35 percent higher in both Honduras and Guyana, and 4 percent higher in Haiti. Again, the relative impact will be affected by the level of deaths due to other causes as well as the level of HIV prevalence in the population.

Two-thirds of AIDS Deaths Among Children Will Occur After the Age of One

Child mortality rates will be higher due to AIDS mortality since many HIV infected children survive beyond their first birthday. Those countries with elevated levels of HIV prevalence and low non-AIDS child mortality will see child mortality rates higher than would have been without AIDS.

For example, child mortality rates are estimated to be about 20 percent higher than they would have been without AIDS in Cameroon and in Côte d'Ivoire. By the year 2010, child mortality rates are expected to be 40 percent higher. In Nigeria, the current child mortality rate is estimated to be 12 percent higher and by 2010, it will be 65 percent higher.

In East and Southern Africa, the impact on child mortality rates will be even greater, particularly among those countries that had greatly reduced child mortality. In Kenya, the child mortality rate is estimated to be 65 percent higher than it would have been without AIDS and by the year 2010, it will be over twice as high. In South Africa, the current child mortality rate is estimated to be 27 percent higher, and in Zimbabwe, the current rate is estimated to be nearly three times as high (Figure 3). By the year 2010, the child mortality rate in South Africa will be more than twice as high as it would have been without AIDS and in Zimbabwe it will be three and a half times as high.

The impact on child mortality rates in Asia are not yet as severe as they are in Africa, since the HIV/AIDS epidemics started later there and the present national prevalence rates are still low. Currently, child mortality rates are six percent higher in Burma and in Cambodia. In Thailand, where non-AIDS child

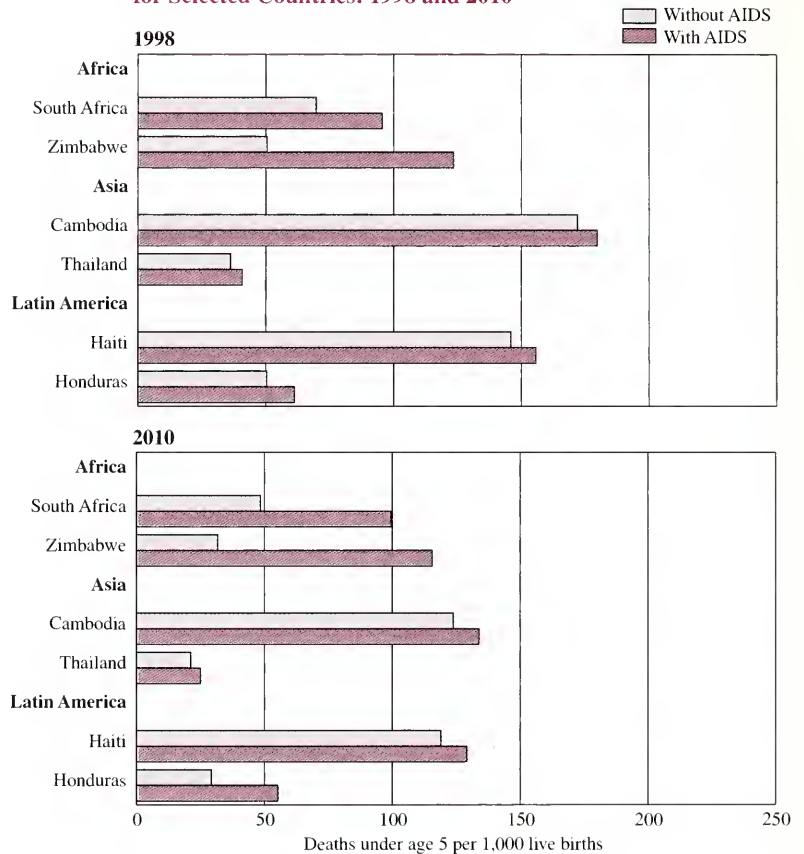
mortality is much lower, AIDS is currently resulting in a child mortality rate 13 percent over what it would have been without AIDS. By the year 2010, AIDS mortality will result in even higher child mortality rates: 15 percent higher in Burma, 8 percent in Cambodia and 18 percent in Thailand.

In Latin America and the Caribbean, AIDS mortality again is having different impacts on countries due to the underlying non-AIDS childhood mortality and the HIV prevalence levels. In Brazil, where non-AIDS child mortality is among the lowest in the region, the child mortality rate is estimated to be 26 percent higher because of the AIDS epidemic. In contrast, the AIDS epidemic in Haiti has resulted in a child mortality rate 7 percent higher. In Guyana, which may have an HIV/AIDS epidemic similar to those seen in Sub-Saharan Africa, the child mortality rate is 16 percent higher. And in Honduras, the current child mortality rate is 21 percent higher.

By the year 2010, the AIDS epidemics will have even greater impacts on the child mortality rates in countries in Latin America and the Caribbean. In Brazil, the child mortality rate is projected to be 52 percent higher. In Guyana and Honduras, child mortality rates will be around 80 percent higher. And in Haiti, the rate again will only be about 8 percent higher. This is again due to the underlying higher rates of non-AIDS child mortality rate in Haiti.

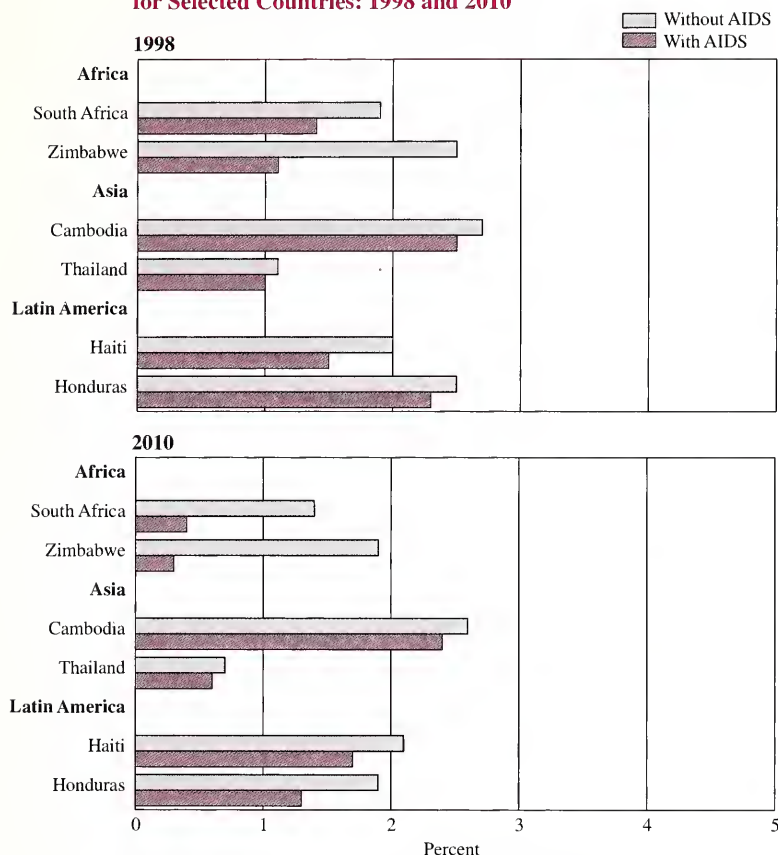
Figure 3.

Child Mortality Rate With and Without AIDS for Selected Countries: 1998 and 2010



Source: U.S. Bureau of the Census, International Data Base and unpublished tables.

Figure 4.
**Growth Rate With and Without AIDS
for Selected Countries: 1998 and 2010**



Source: U.S. Bureau of the Census, International Data Base and unpublished tables.

Even With Higher Mortality Rates Due to AIDS, Growth Rates Will Remain Positive in the Year 2010 Although Some Will be Near Zero

In some of the countries most severely affected by the AIDS epidemics, low projected total fertility rates combined with high expected mortality from AIDS will result in projected zero or near zero population growth. AIDS mortality, however, will reduce the growth rates in all countries.

Currently, growth rates are estimated to be 6 percent lower in Nigeria, 20 percent lower in Côte d'Ivoire and Uganda, and over 50 percent lower in Zimbabwe (Figure 4). By the year 2010, growth rates are projected to be reduced 75 percent or more in South Africa and in Zimbabwe (Figure 4 second panel). In Kenya, growth rates will be reduced 66 percent. In Nigeria, growth rates are projected to be over 40 percent lower.

In Asia, growth rates have been reduced about 10 percent in Burma and in Thailand. In Cambodia, growth rates are currently estimated to be about 7 percent lower. By the year 2010, growth

rates are projected to be reduced by 14 percent in Thailand, 13 percent in Burma, and 8 percent in Cambodia.

Guyana has been experiencing negative population growth from high out-migration. AIDS mortality is further increasing that negative population growth. In Brazil and Haiti, growth rates have been reduced by 20 and 25 percent, respectively. In Honduras, current growth rates are estimated to be 8 percent lower due to AIDS mortality.

Future migration patterns for Guyana are difficult to project. However, AIDS mortality in Guyana is projected to reduce an estimated 1 percent growth rate for the year 2010 to nearly zero. In Brazil and Honduras, future growth rates are projected to be about 30 percent lower in the year 2010. Growth rates in Haiti are projected to be about 20 percent lower.

16 Million Fewer People Today in the 21 Most Affected Countries in Sub-Saharan Africa

Differences in population size between the AIDS-adjusted and the non-AIDS scenarios are often substantial, amounting to millions of persons. Some, but not all of these differences are due to AIDS mortality. The balance of the differences in population size is because of decreased population resulting from premature female deaths and the lost future population growth resulting from that deficit.

Although Nigeria probably has a relatively lower HIV prevalence rate compared to other countries in Sub-Saharan Africa, there are currently nearly 1 million fewer people there due to the AIDS epidemic, 110.5 million instead of 111.3 million. It is estimated that there

are 900,000 fewer people in South Africa, 1.3 million fewer people in Uganda, and 1.6 million fewer people in Zimbabwe directly and indirectly due to AIDS (Figure 5).

By the year 2010, there will be a total of 71 million fewer people in the region. Kenya will have 6.7 million fewer people, South Africa will have 5.6 million fewer people, Nigeria will have 11.7 million fewer people, Uganda will have 4.2 million fewer people, and Zimbabwe will have 4.4 million fewer people than there would have been without the effect of AIDS (Figure 5 second panel).

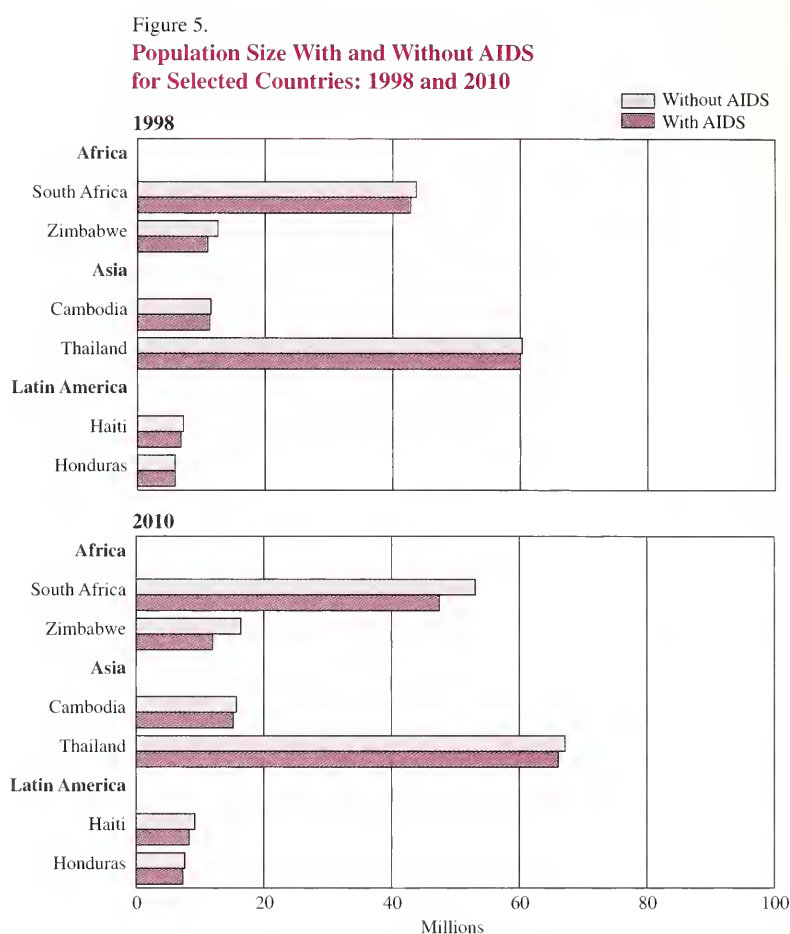
In Asia, current estimates indicate that there are 400,000 fewer people in Burma, 200,000 people less in Cambodia, and 300,000 fewer people in Thailand. By the year 2010, Burma will have 1.6 million fewer people, Cambodia's population will have been reduced by a potential 500,000 people and Thailand will have 1.1 million fewer people.

The population of Brazil is one of the largest in Latin America, and with the AIDS epidemics, will lose the most people. Current estimates show 2.3 million fewer people in Brazil with a projected loss of population of 10 million people by the year 2010. Current estimates only indicate a population loss in Haiti, with 400,000 fewer people. By the year 2010, Haiti will have 900,000 fewer people.

Perhaps the Largest Demographic Impact of AIDS Mortality Will Be on Life Expectancies

Many potential years of life will be lost due to the AIDS epidemics. AIDS will result in higher mortality rates in childhood, as well as among young adults where normal mortality is quite low.

As a result, AIDS deaths will have a relatively larger impact on life expectancies



Source: U.S. Bureau of the Census, International Data Base and unpublished tables.

than on perhaps any other demographic indicator. In those countries most seriously affected by AIDS, life expectancies have been reduced by 4 to 26 years. In Kenya, the AIDS epidemic has resulted in 18 years of life lost. In Nigeria, current estimated life expectancy has been reduced 4 years and in Zimbabwe, 26 years of life have been lost (Figure 6).

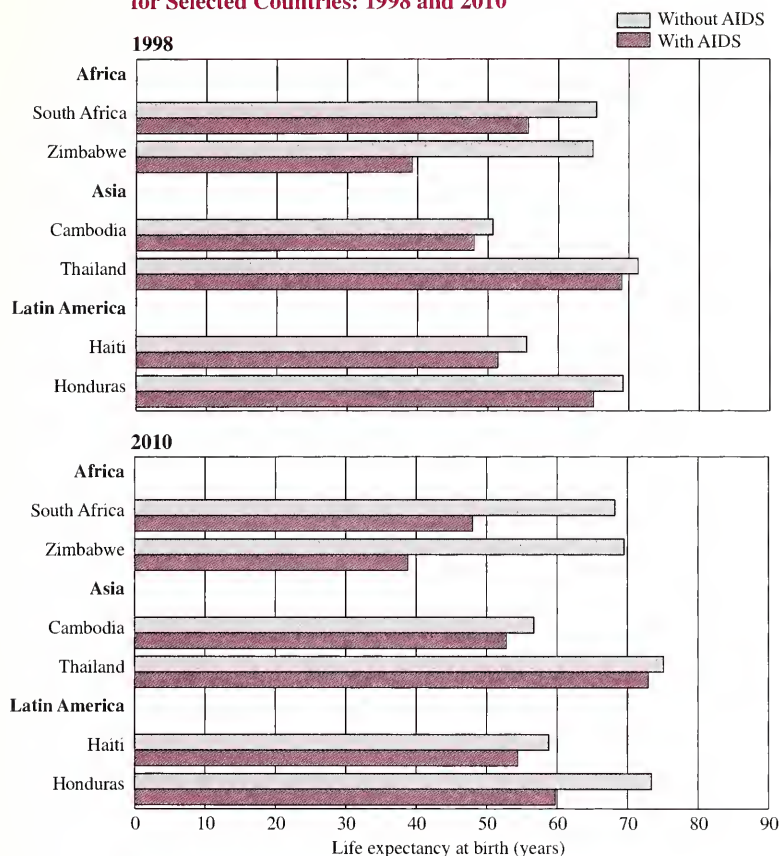
By the year 2010, 8 to 31 years of life will have been lost in those countries most seriously affected by AIDS in Sub-Saharan Africa. Without AIDS, life expectancies would have reached 69.5 in Zimbabwe, but with the AIDS epidemic, life expectancy has been reduced by 31 years. In Kenya, 26 years of life will

have been lost, in Nigeria 19 years and in Uganda, 12 years (Figure 6 second panel).

In Asia, life expectancy has been reduced by 2 to 3 years. In Burma and Cambodia nearly 3 years of life have been lost and in Thailand life expectancy has been reduced 2 years. By the year 2010, life expectancies will be reduced by 2 to 4 years in these Asian countries.

In Latin America and the Caribbean, AIDS deaths have reduced current life expectancies from 3 to 7 years. Life expectancy in Brazil has been reduced 7 years. Honduras and Haiti are now experiencing 4

Figure 6.
**Life Expectancy With and Without AIDS
for Selected Countries: 1998 and 2010**



Source: U.S. Bureau of the Census, International Data Base and unpublished tables.

years of life lost and in Guyana, life expectancy is now 3 years lower. By the year 2010, life expectancies will have been reduced by 4 to 17 years in these countries.

In 21 African Countries More Than 5 Percent of the Urban Population Is HIV Positive⁵

Many of the epidemics in Africa can be described as generalized, with high (over 5 percent) HIV prevalence in the general adult population and increasing

urban to rural equalization of HIV prevalence.⁶ In 21 African countries, HIV prevalence among low-risk urban adult populations (15-49 year olds) has reached 5 percent. The most severely affected countries are Botswana, Namibia, Swaziland, Zambia, and Zimbabwe, where 18 to 25 percent of all adults are HIV positive. Over 2 million adults are HIV positive in each of the following countries: Ethiopia, Kenya, Nigeria, and South Africa.

Although HIV epidemics have stabilized or declined in some urban areas, in others the epidemics are increasing

rapidly (Figure 7). HIV seroprevalence levels among antenatal clinic women have declined in Kampala, Uganda from a peak of 30 percent in 1992 to 15 percent in 1996. And in Lusaka, Zambia, HIV prevalence among antenatal women tested remained around 25 percent between 1990 and 1994. In Francistown, Botswana, however, HIV prevalence among antenatal clinic women increased from 8 percent in 1991 to 43 percent in 1996. Similarly, HIV prevalence among antenatal clinic women tested in Kwazulu-Natal, South Africa, increased from 2 percent in 1990 to 20 percent in 1996. High prevalence levels among antenatal clinic attendees have also been reported in other provinces of South Africa: Free State, 17 percent; North West, 25 percent; and Mpumalanga, 16 percent.

Some countries initially spared are now seeing increases in HIV seroprevalence. In Nigeria, median prevalence among antenatal clinic women tested in urban sites increased from less than 1 percent in 1991-92 to 4 percent in 1993-94. In Lagos State, 7 percent of antenatal clinic women tested in 1993-94 were HIV positive. In Yaounde, Cameroon, HIV prevalence among antenatal clinic women increased from 1 percent in 1989 to 3 percent in 1995 and in Douala, HIV prevalence increased from 1 percent in 1990 to 6 percent in 1994.

The HIV Pandemic in Asia is Extremely Diverse

There is no evidence of an HIV epidemic in some countries of Asia such as Mongolia and South Korea. In other countries, such as Thailand and Burma, 2 percent of the adult population are now HIV positive. In Cambodia, nearly 5 percent of the adult population is HIV positive. In Asia, HIV transmission occurs mainly through heterosexual contact, from mother to child, and through injecting drug use.

Rapid increases in HIV prevalence have

⁵All HIV prevalence data cited in this report can be found in the HIV/AIDS Surveillance Data Base, 1998 version, U.S. Bureau of the Census.

⁶World Bank (1997).

Sub-Saharan African Countries Most Affected by the HIV/AIDS Epidemic

Botswana
Burkina Faso
Burundi
Cameroon
Central African Republic
Congo (Brazzaville)
Côte d'Ivoire
Congo (Kinshasa)
Ethiopia
Kenya
Lesotho
Malawi
Namibia
Nigeria
Rwanda
South Africa
Swaziland
Tanzania
Uganda
Zambia
Zimbabwe

been occurring in Cambodia over the last few years (Figure 8). HIV prevalence among sex workers tested in Phnom Penh increased from 10 percent in 1992 to 42 percent in 1996. Among sex workers tested in 17 sites in 1996, HIV prevalence ranged from 13 percent in Kandal province to nearly 60 percent

Figure 7.
HIV Seroprevalence for Pregnant Women in
Selected Urban Areas of Africa: 1985-1997

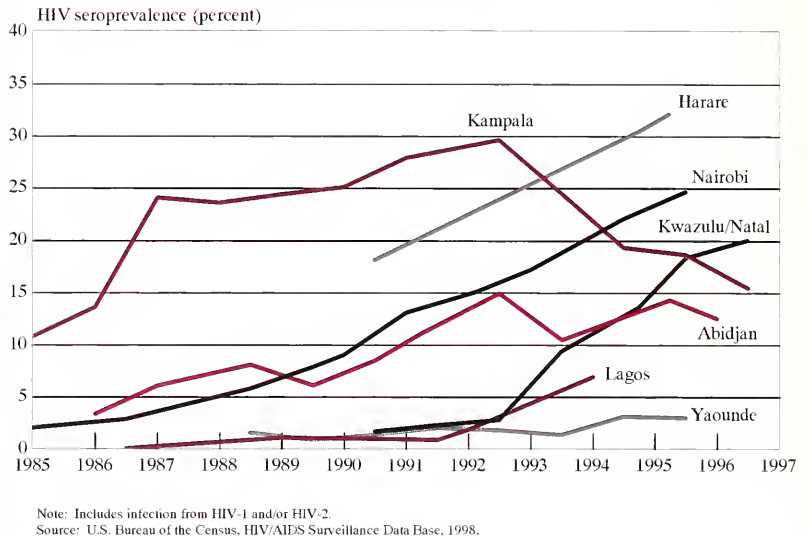


Figure 8.
HIV Seroprevalence for Pregnant Women in
Selected Urban Areas of Asia: 1990-1997

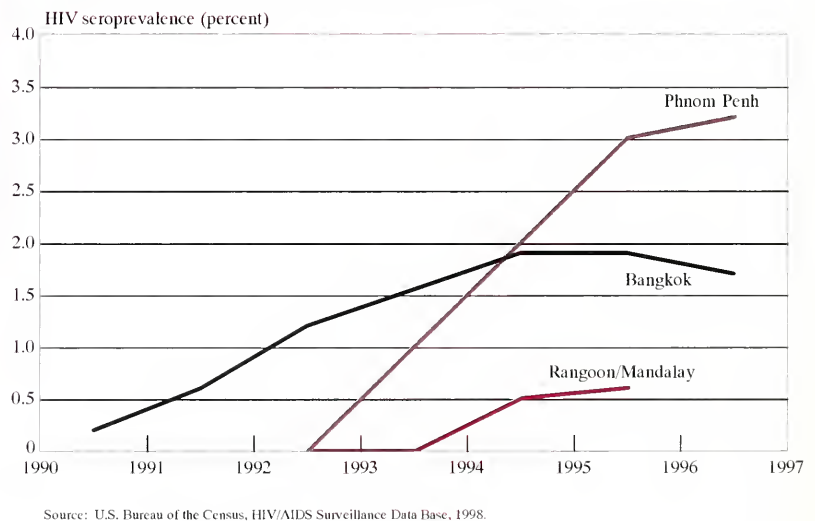
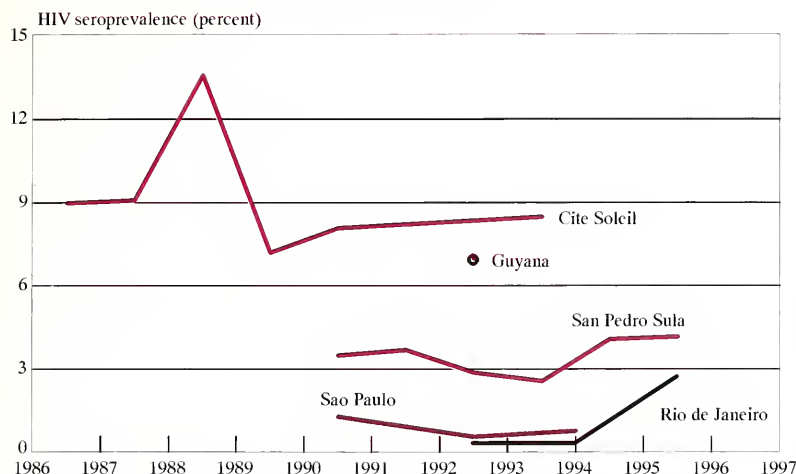


Figure 9.

HIV Seroprevalence for Pregnant Women in Selected Urban Areas of Latin America: 1986-1997



Source: U.S. Bureau of the Census, HIV/AIDS Surveillance Data Base, 1998.

in Battambang province. HIV prevalence among antenatal clinic attendees in Phnom Penh increased from no evidence of HIV infection in 1992 to 3 percent of women tested in 1996. In the 17 sentinel surveillance sites outside of Phnom Penh, HIV prevalence ranged from less than 1 to 6 percent of antenatal clinic attendees tested.

In Thailand and Burma, the HIV epidemic continues to affect the population. As in other parts of Asia, HIV transmission occurs through heterosexual contact, from mother to child, and via injecting drug use. In Rangoon and Mandalay, HIV prevalence among sex workers increased from 4 percent in 1992 to 21 percent in 1996. Among antenatal clinic women tested in Rangoon and Mandalay in 1995, less than 1 percent were HIV positive. However, HIV prevalence among antenatal clinic women in Tachileik had reached 8 percent by 1995.

In Thailand, HIV prevalence among sex workers in Bangkok reached a peak of 18 percent in 1992 but appears to be declining. Seven percent of sex work-

ers tested in Bangkok in 1996 were HIV positive. Declines are also being seen among antenatal clinic women in Bangkok (Figure 8). In other areas of the country, HIV prevalence among sex workers appears to have stabilized between 18 and 20 percent between 1993 and 1996. Among antenatal clinic attendees tested in 1996, HIV prevalence ranged from 2 to 8 percent with the highest prevalence in the Northern region.

The epidemic in India differs from state to state, with high HIV prevalence in west and southern India to low levels of HIV in east and northern India. In Mumbai (Bombay), HIV prevalence increased from 2 to 3 percent in sexually transmitted disease (STD) clinic attendees before 1990 to 36 percent in 1994. HIV prevalence among sex workers tested in Mumbai rose from 1 to 51 percent between 1987 and 1993. Studies among sex workers in Calcutta, in contrast, show clear and consistently low prevalence of one percent. Among antenatal clinic attendees tested in Mumbai, two percent tested positive for

HIV in 1995. In Manipur, in the north, an HIV epidemic is occurring among injecting drug users, where 60 to 70 percent of injecting drug users tested in 1996 were HIV positive. A concurrent epidemic is now occurring among the antenatal clinic attendees in that area. However, there is a general lack of consistent HIV seroprevalence information making it difficult to analyze the extent of the spread of the HIV epidemic in India.

HIV/AIDS is Well Established In the Caribbean and Latin American Region but Information is Scarce

The spread of HIV/AIDS has been slower in Latin America and the Caribbean than in other developing regions of the world, but sentinel surveillance data are rare and information on HIV prevalence is difficult to find. What can be determined to date is that the HIV epidemic varies from country to country, with some countries in the nascent stage, with few cases of AIDS and low HIV prevalence in high-risk groups; and others in the concentrated stage, with high prevalence in predominantly homosexual/bisexual or injecting drug user groups with low prevalence in general adult population. In some countries, transmission through injecting drug use has had an important impact on the epidemic.

In the Caribbean the HIV epidemic has been characterized as mostly a heterosexual epidemic. In Haiti, HIV prevalence has remained stable over the past several years at around 5 percent of the adult population. In Guyana, among antenatal clinic women tested in 1992, 7 percent were HIV positive (Figure 9). The epidemic increased from 1 percent of adults infected in 1994 to 2 percent in 1997 and is projected to increase to 13 percent by 2010.

The epidemics in Central America also appear to be mostly caused by heterosexual transmission. Recent data from Honduras indicate an increase in HIV prevalence in the major urban centers. HIV prevalence among sex workers increased in Tegucigalpa from 6 percent in 1989 to 8 percent in 1996. In San Pedro Sula, HIV prevalence among sex workers has ranged from 15 to 20 percent since 1989. HIV prevalence among antenatal clinic attendees in Tegucigalpa increased from 0.2-0.3 percent in 1991-1993 to 1 percent in 1996. In San Pedro Sula, HIV prevalence among antenatal clinic attendees had increased to 4 percent by 1994.

In Brazil, there is considerable HIV transmission due to injecting drug use and the epidemic has progressed since the early 1980s from one predominated by homosexual/bisexual transmission to one with an increasing heterosexual component. High rates of HIV infection among injecting drug users in Brazil have been found since the late 1980s. Fifty percent of injecting drug users tested in two sites in Sao Paulo were HIV positive in 1989. Since 1990, a third of all injecting drug users tested in major urban areas tested positive for HIV. In 1990, 1 percent of antenatal women in Sao Paulo tested positive for HIV. As more sentinel sites began reporting, the median HIV prevalence rate among antenatal clinic attendees varied around 1 percent of women tested. In 1995, nearly 3 percent of antenatal women tested in Porto Alegre and Rio de Janeiro tested positive for HIV and in 1996, 5 percent of women in Santos tested positive for HIV.

The HIV/AIDS Pandemic Continues to Evolve

By the end of 1997, the United Nations Joint Programme on HIV/AIDS (UNAIDS) estimated that over 40 million people had become infected with HIV since the beginning of the pandemic and that over 11 million of these people have already died. The majority of the infections have occurred in Sub-Saharan Africa, but the increases that are occurring in Asia may result in more infections in that region than in Sub-Saharan Africa.

This is the third round of population estimates and projections in which the Census Bureau has incorporated AIDS mortality. Some of our original conclusions have remained the same:

- AIDS will not overcome the momentum of population growth in the most affected countries, particularly in Sub-Saharan Africa. The region's current high fertility rate ensures that the population will continue to increase.
- Changes in behavior, both spontaneous and induced, may help to create an early plateau in some epidemics and ultimately may result in declines in HIV infection levels. We are clearly seeing this in Thailand and in certain areas of Uganda.
- Given the uncertainties surrounding the course of AIDS epidemics, it is probable that refinements and adjustments in the method for the incorporation of AIDS-related mortality into these population projections will be adopted in future rounds of the projection process.

Uganda: A Rare Example of Success

When the general public thinks about the AIDS epidemic in Africa, they usually think of Uganda first, and they assume that the epidemic is worse there than in any other country. However, HIV surveillance data show that the AIDS epidemics are far worse in some of the countries in Southern Africa such as in Botswana, Zimbabwe, and Zambia. HIV prevalence among Ugandan antenatal women in Kampala and the Rakai district have been high, as high as 30 percent. However, in other areas of the country prevalence is much lower. Since 1993, prevalence rates have fallen to 15 percent among antenatal women in Kampala.

Uganda, however, was the first country in Africa to admit they had an AIDS epidemic and, with the strong backing of President Museveni, AIDS prevention programs are making an impact. At the opening ceremony of the IXth International Conference on AIDS and STDs in Africa held in Kampala, President Museveni stressed the importance of political leadership in the fight against AIDS. The results of this leadership are showing in Uganda.

Appendix A.

Population Projections Incorporating AIDS



Population Projections Incorporating AIDS

Background

Although it has been clear for a number of years that mortality estimates and projections for many countries would have to be revised due to AIDS mortality, the lack of accurate empirical data on AIDS deaths, the paucity of data on HIV infection among the general population, and the absence of tools to project the impact of AIDS epidemics into the future have all hampered these efforts. While the accuracy of data on AIDS deaths has not substantially improved, knowledge of HIV infection has expanded and modeling tools have become available to project current epidemics into the future.

The methodology used to project AIDS mortality into the future for this report follows generally the method adopted for *World Population Profile: 1994*, and *World Population Profile: 1996* with continuing modifications. The method consists of the following steps:

1. Establish criteria for selecting countries for which AIDS mortality will be incorporated into the projections.
2. For each selected country, determine the empirical epidemic trend and a point estimate of national HIV prevalence.
3. Model the spread of HIV infection and the development of AIDS in the population, generating alternative scenarios ranging from high to low AIDS epidemics, and produce the seroprevalence rates and AIDS-related age-specific mortality rates which correspond to each epidemic.
4. Use the empirical levels and trends (from step 2) to establish a factor representing each country's position on a continuum between high and low epidemics (from step 3). Use the derived factor to generate a unique interpolated epidemic.

5. Use weighted country total adult seroprevalence to determine an appropriate location on the total country epidemic curve implied by the interpolation factor. This projects adult HIV seroprevalence for the total country.
6. Interpolate AIDS-related mortality rates, by age and sex, associated with the estimated speed and level of HIV from epidemic results for the period 1990 to 2010.

In the sections that follow, each of these steps is described, and the method is illustrated.

Country Selection Criteria

The International Programs Center, U.S. Bureau of the Census, maintains an HIV/AIDS Surveillance Data Base. This data base is a compilation of aggregate data from HIV seroprevalence studies in developing countries. Currently, it contains over 30,000 data items drawn from nearly 3,800 publications and presentations. As a part of the biannual updating of the data base, new data are reviewed for inclusion into a summary table which, for each country, lists the most recent and best study of seroprevalence levels for high- and low-risk populations in urban and rural areas.⁷

A review of the data in the summary table suggested that a reasonable cut-off point for selection would be countries which had reached 5 percent HIV prevalence among their low-risk urban populations, or, based on recent trends, appeared to be likely to reach this level in the near future.

⁷High risk includes samples of prostitutes and their clients, sexually-transmitted disease patients, or other persons with known risk factors. Low risk includes samples of pregnant women, volunteer blood donors, or others with no known risk factors. For a more complete description of the selection criteria, see U.S. Bureau of the Census (1995).

A total of 26 countries now meet these criteria for the incorporation of AIDS mortality in the projections. Twenty-one of these countries are in Africa. The African countries are as follows (newly added countries are shown in italics):

Botswana
Burkina Faso
Burundi
Cameroon
Central African Republic
Congo (Brazzaville)
Congo (Kinshasa)
Côte d'Ivoire
Ethiopia
Kenya
Lesotho
Malawi
Namibia
Nigeria
Rwanda
South Africa
Swaziland
Tanzania
Uganda
Zambia
Zimbabwe

Outside of Africa, the following countries meet the criteria:

Guyana
Burma
Haiti
Cambodia
Honduras

Two other countries, Brazil and Thailand, have also been included since 1994 because country-specific modeling work had already been completed. The simplified approach taken in these special cases is described in a later section.

Table A-1.
Empirical Seroprevalence Data for Selected Countries

Country	Urban trend, pregnant women		Estimated total country		
	Date	Percent seropositive	Date	Percent seropositive	Jan. 1, Year
Botswana	1995	27.8	1997	31.4	1995
Burkina Faso	1991	7.8	1994	11.9	1995
Burundi	1986	14.7	1993	20.0	1995
Cameroon	1993	4.0	1995	5.7	1995
Central African Republic	1987	4.7	1995	9.3	1995
Congo (Brazzaville)	1988	3.1	1994	7.2	1995
Congo (Kinshasa)	1986	6.9	1992	9.2	1995
Côte d'Ivoire	1994	10.3	1996	12.4	1995
Ethiopia	1991	10.7	1997	17.9	1995
Kenya	1993	14.4	1996	18.5	1995
Lesotho	1993	3.4	1994	4.1	1995
Malawi	1992	22.0	1996	27.6	1995
Namibia	1992	4.2	1997	16.0	1998
Nigeria	1992	2.9	1994	5.4	1995
Rwanda	1991	26.2	1997	32.7	1998
South Africa	1994	3.0	1997	11.8	1998
Swaziland	1994	21.9	1997	26.0	1998
Tanzania	1987	3.7	1997	13.7	1995
Uganda—High	1988	24.0	1992	29.5	1995
Uganda—Low Stable	1986	10.7	1997	15.3	1998
Zambia	1990	24.5	1995	27.5	1995
Zimbabwe	1991	18.7	1996	31.0	1998
Brazil ¹					0.7
Guyana	1991	1.5	1992	1.9	1995
Haiti	1990	8.0	1994	8.5	1995
Honduras	1992	2.0	1996	4.1	1995
Burma	1993	0.6	1997	0.9 ²	1995
Cambodia	1996	3.0	1996	3.2	1995
Thailand ¹					2.1

¹Country-specific modeling was undertaken for Brazil and Thailand.

²Burma military recruit data.

Source: HIV/AIDS Surveillance Data Base, International Programs Center, U.S. Bureau of the Census, January 1997.

Empirical Epidemic Trends

For each of the 26 countries meeting the selection criteria, staff members reviewed the HIV seroprevalence information available in the HIV/AIDS Surveillance Data Base to establish urban seroprevalence trends over time (Table A-1, col. 1-5) and to establish the estimated prevalence for the whole country (Table A-1, col. 6-7). The two data points judged to be most representative for the urban low-risk population were identified and used to calculate the annual change between the dates of the two studies. National prevalence figures were based on year-end 1994 and 1997 estimates prepared by the World Health Organization and the United Nations Joint Programme on HIV/AIDS.

Alternative Scenarios

To project the impact in the selected countries, three alternative epidemic scenarios were developed, corresponding to low-, medium-, and high-impact AIDS epidemics. These scenarios were developed using iwgAIDS, which is a complex deterministic model of the spread of HIV infection and the development of AIDS in a population. This model was developed under the sponsorship of the Interagency Working Group (iwg) on AIDS Models and Methods of the U.S. Department of State (Stanley et al. 1991).

All three of these epidemic scenarios incorporate increasing levels of behavior change in the form of increased condom use. This assumption corresponds to actual changes in behavior that are now beginning to occur in some countries. In addition, all three epidemics exhibit plateauing and subsequent declines in prevalence in the later stages of the epidemic, particularly in urban areas.

Figure A-1.

Three Scenarios and Empirical Trend in Urban Female HIV Seroprevalence

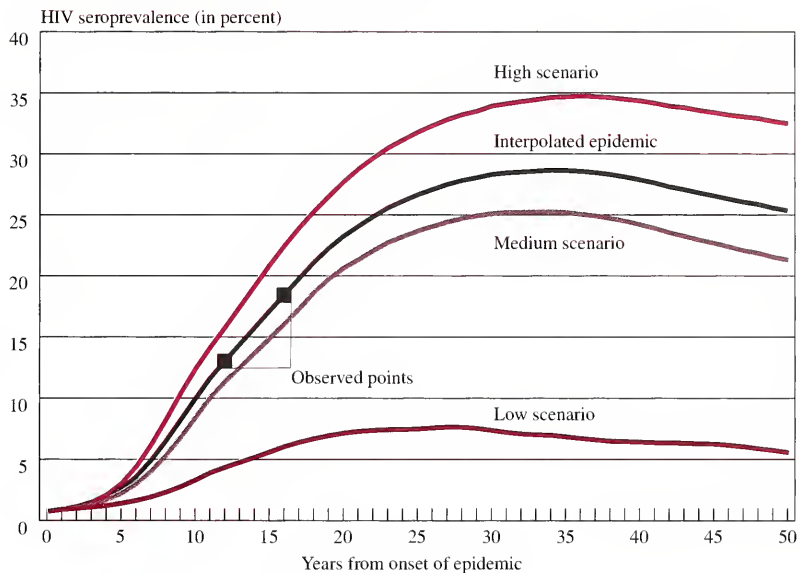


Figure A-2.

Three Scenarios and Empirical Trend in Total Female HIV Seroprevalence

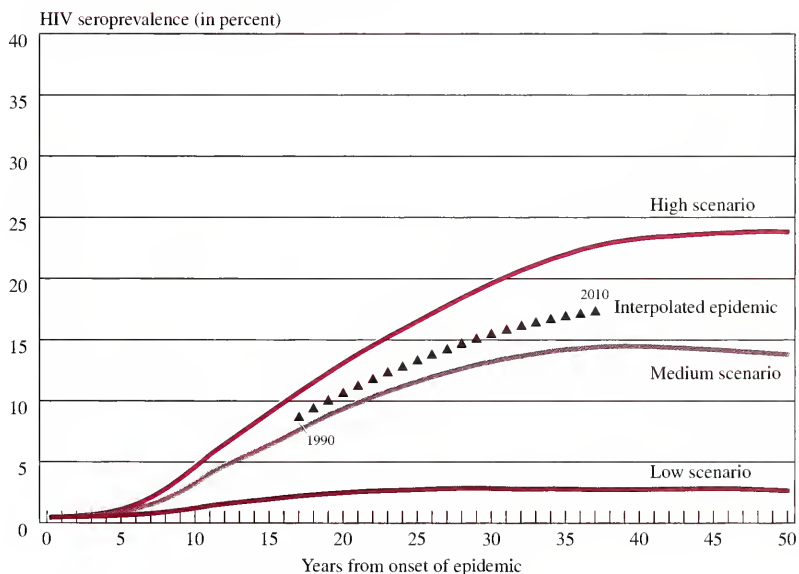
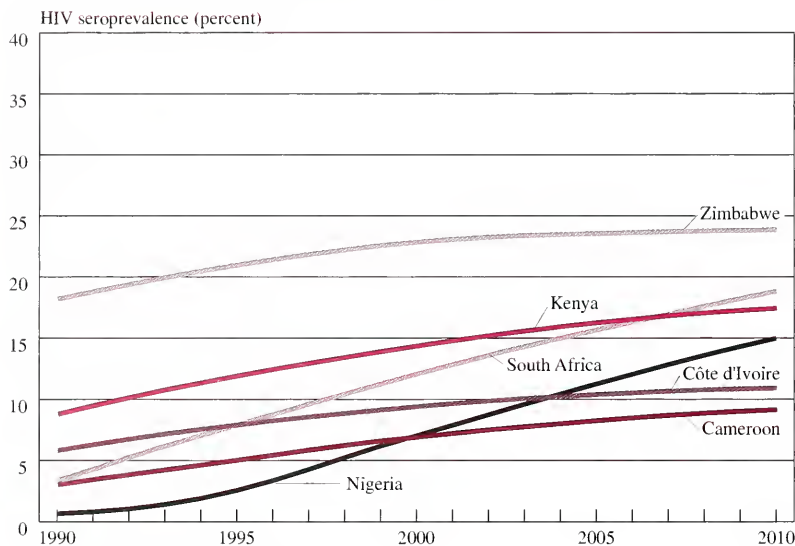
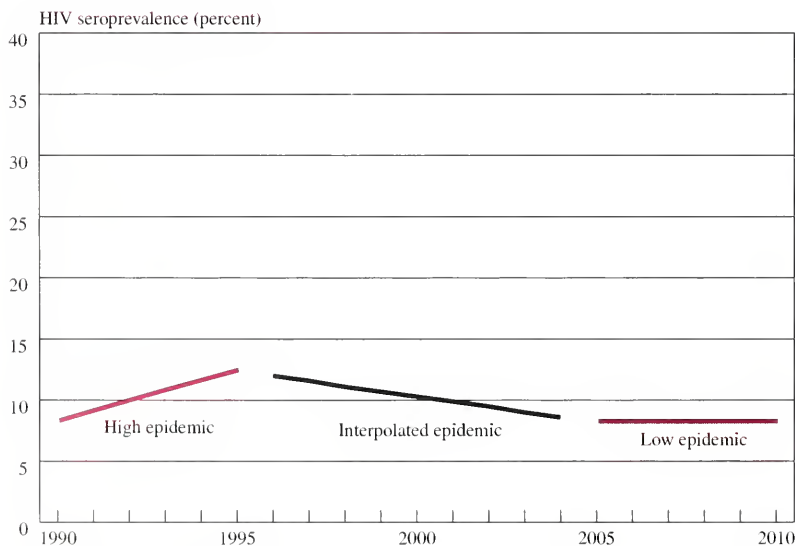


Figure A-3.
Projected HIV Seroprevalence for Selected Countries of Africa



Source: HIV/AIDS Surveillance Data Base, 1998.

Figure A-4.
Projected HIV Seroprevalence for Uganda



Source: U.S. Bureau of the Census, unpublished tables.

Interpolation of a Unique Epidemic

The empirical urban trend from each country was used to interpolate among the three epidemic scenarios to derive an epidemic trend line matching the observed HIV seroprevalence increase between the two points. Thus, both the level and the rate of increase of the urban epidemic were matched through this procedure which produced an interpolation factor used in subsequent steps (see Figure A-1).

Projected Total Seroprevalence

At this point in the estimation procedure, no direct linkage has been made to the total-country prevalence or to a particular calendar year in this country's epidemic. The next step accomplishes these tasks. The total-country adult prevalence estimate (Table A-1, col. 6) was matched with the one implied using the interpolation factor. From this comparison, an "offset" figure was calculated, corresponding to the number of years of difference between the start of the epidemics in the three scenarios, and the empirical epidemic at the reference date (see Figure A-2). The resulting projected epidemics for the 1990 to 2010 period for selected countries in Africa are shown in Figure A-3.

AIDS-Related Mortality Rates

Based on the interpolation factor and the offset described above, AIDS-related age-sex-specific mortality rates (m_x values) at 5-year intervals from 1990 to 2010 were interpolated and added to non-AIDS m_x values for the same period.⁸ Population projections were prepared with the combined m_x values as input, using the Rural-Urban Projection program of the U.S. Bureau of the Census.

⁸Non-AIDS m_x values were derived by making standard assumptions concerning the improvement in mortality conditions.

The future course of the AIDS pandemic is uncertain, but the projections require that some assumptions be made. It was assumed that the epidemics would peak in 2010, with no further growth in HIV infection after that year. AIDS mortality was assumed to decline from the level reached in 2010 to nil by 2050, thus implying a return to "normal" mortality levels in the latter year. To implement the projection process, life tables for 2050, assuming no AIDS mortality, were used.

The Special Case of Uganda

Prevalence levels for pregnant women in major urban areas in Uganda appear to have peaked in the early 1990s, with rather dramatic declines subsequently. Infection levels of nearly 30 percent were detected in 1992; by 1996, HIV prevalence rates had declined by nearly 50 percent (Table A-1). Although discussion of the causes of these declines is still underway, it appears clear that a substantial change has occurred. Consequently, the approach described above needed to be modified to conform to the empirical evidence of declining HIV prevalence rates.

To handle this epidemiological pattern in Uganda, the 1990-2010 period was divided into a rising epidemic period

(1990-1995), a transition period (1995-2005), and a period of a relatively low and stable epidemic (2005-2010). This classification is represented in Figure A-4. Mortality rates corresponding to the rising epidemic and the stable epidemic were separately derived, and the transition between the two was accomplished by linear interpolation between the two epidemics.'

The Special Cases of Brazil and Thailand

Modeling activities have also been undertaken for Brazil and Thailand with the support of the Interagency Working Group. AIDS epidemics in these two countries have substantial homosexual and intravenous drug use components, while those in Africa do not (WHO/GPA 1993). For Brazil, AIDS-related age-sex-specific mortality rates were estimated from the iwgAIDS model and added directly to the non-AIDS mortality rates previously prepared for the projection program. For Thailand, AIDS-related mortality rates from recent epidemiological and demographic projections (TNESDB 1994) were added to the non-AIDS m_x values for the 1990 to 2010 period.

Caveats and Limitations

In developing the methodology for these projections, the International Programs Center has attempted to

maximize the use of both the empirical data and the modeling tools available. However, there is much that is unknown about the dynamics of AIDS epidemics in countries around the world, and the methodology is necessarily imprecise. The actual path of AIDS epidemics in the countries that were selected will undoubtedly differ from the course projected. As epidemics grow, future behavior changes and interventions being implemented in countries around the world may alter that course.

What if AIDS epidemics do not peak early in the next century as projected? Will entire populations become infected with HIV and eventually die from AIDS? The simulations used for this report suggest that this will not happen in any population, although population declines are possible with a sustained wide-spread epidemic, particularly in the presence of low fertility levels. Variations in sexual behavior help to ensure that the majority of the population in countries around the world is not at high risk of HIV infection. With substantial proportions of the population at lower risk of infection, each of the epidemic scenarios displays a definite plateau in HIV seroprevalence after the initial rapid rise.

Appendix B.
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Appendix C.
Glossary



Glossary

Age structure. The distribution of a population according to age, usually by 5-year age groups.

Age-specific fertility rate. The number of births during a year to women in a particular age group, usually per 1,000 women in a 5-year age group at mid-year.

AIDS. Acquired immune deficiency syndrome.

Birth rate. The average annual number of births during a year per 1,000 population at midyear. Also known as the crude birth rate.

Crude birth rate. See birth rate.

Crude death rate. See death rate.

Death rate. The average annual number of deaths during a year per 1,000 population at midyear. Also known as the crude death rate.

Growth rate. The average annual percent change in the population, resulting from a surplus (or deficit) of births over deaths and the balance of migrants entering and leaving a country. The rate may be positive or negative. Also known as population growth rate or average annual rate of growth.

HIV. Human immunodeficiency virus. The virus that causes AIDS.

Infant mortality rate. The number of deaths of infants under 1 year of age from a cohort of 1,000 live births. Denoted 1q0 or IMR, it is the probability of dying between birth and exact age 1.

iwgAIDS. Interagency Working Group on AIDS.

Life expectancy at birth. The average number of years a group of people born in the same year can be expected to live if mortality at each age remains constant in the future.

Natural increase. The difference between the number of births and the number of deaths.

Pandemic. A global epidemic.

Projections. Data on population and vital rates derived for future years based on statistics from population censuses, vital registration systems, or sample surveys pertaining to the recent past, and on assumptions about future trends.

Rate of natural increase. The difference between the crude birth rate and the crude death rate.

Seroprevalence. The percent of a population testing positive for infection in a blood test. In the context of this report, the percent testing positive for antibodies to HIV.

Total fertility rate. The average number of children that would be born per woman if all women lived to the end of their childbearing years and bore children according to a given set of age-specific fertility rates.

Under-5 mortality. Number of deaths of children under 5 years of age from a cohort of 1,000 live births. Denoted 5q0, it is the probability of dying between birth and exact age 5.

UNAIDS. United Nations Joint Programme on HIV/AIDS.

Vital events. Births and deaths.

Vital rates. Birth rates and death rates.

WHO. World Health Organization.

WHO/GPA. World Health Organization/Global Programme on AIDS.

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The International Programs Center (IPC) conducts demographic and socioeconomic research on all countries of the world. We estimate and project population for all countries, study trends in key demographic indicators, conduct specialized research on topics such as population aging, the role of women in development, the prevalence of HIV/AIDS, and the socioeconomic status of population in transition economies. IPC also provides technical assistance and training to national statistical offices and other agencies worldwide. Our work is funded by other U.S. and foreign government agencies, international organizations, and businesses.

Research results are issued in publications, staff papers, and electronic databases. Single copies of most reports are available at no cost.

Recent Publications

World Population Profile: 1998. Compendium in the World Population Profile series. The Special Focus section in 1996 was on Adolescent Fertility in the Developing World.

Trends in Adolescent Fertility and Contraceptive Use in the Developing World. 1996. Draws upon survey data for 56 developing countries to show how adolescent reproductive behavior has changed over the past 25 years, and to suggest the magnitude of the challenge to improve adolescent reproductive health facing the nations of the developing world during the coming 25 years.

Older Workers, Retirement and Pensions. 1995. Provides an overview of demographic and socioeconomic trends that affect old-age security around the world, and graphical depictions of the status of older workers, retirement trends, and pension systems.

An Aging World II. 1993. Focuses on current and projected numbers and proportions of the world's elderly, as well as socioeconomic characteristics of older populations in 50 nations.

International Briefs. A series of short, individual-country and regional reports summarizing demographic and selected socioeconomic information. Recent issues include "Population Trends: Russia"; "Aging Trends: South Africa"; "Population Trends: India"; and "Old Age Security Reform in China."

Data Bases and Microcomputer Applications

HIV/AIDS Surveillance Data Base. Incorporates extant seroprevalence data obtained from scientific literature and from presentations at international conferences. Microcomputer and Internet versions are available.

International Data Base. Contains tables of demographic and socioeconomic data for all countries of the world. Microcomputer and Internet versions are available.

Integrated Microcomputer Processing System. Contains software packages that perform the major tasks in survey and census data processing.

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